

Longstem Transplants for Riparian Plantings In the Southwest

Many Southwest riparian sites require revegetation following the removal of invasive woody species such as saltcedar and Russian olive. Many of these sites have shallow water tables and support established native riparian phreatophytic vegetation. But because of flood control structures and flow regulation, the surface water hydrology has been altered disconnecting these sites from their flood plain and resulting in no overbank flooding. This supplemental water from flooding is critical in the desert climate for the recruitment of new seedling stands of common obligate riparian species such as cottonwoods, willows, New Mexico olive, indigo bush, false willow, and golden current. Generally, these species require more than twice the water that hot desert climates can provide.

The establishment of obligate riparian woody plants requires either lengthy irrigation until the transplant's root system can extend into the permanent soil moisture above the water table (capillary fringe), or planting techniques that allow immediate or rapid root extension into the water source by utilizing deep planting methods such as the Longstem Planting Methodology. This method allows for planting riparian woody species with minimal or no follow-up irrigation, improves survival rates, and reduces long-term revegetation cost.

The Longstem Planting Method involves placing the lower portion of the root ball of a transplant in contact with the capillary fringe of the water table in the fall when the evapotranspiration demands for plants are reduced (Figure 1). Often this requires that the root crown of a transplant be buried as deep as 4 to 6 feet. By spring, new adventitious root growth has been initiated on the mainstem of the plant, just below the soil surface providing needed oxygen to the root system. At time of planting, a 40-inch by 1-inch diameter watering tube is embedded with each plant. If the capillary water drops beneath the rootball, supplemental water can then be provided until the root system once again becomes in contact with capillary water. When a root system becomes disconnected from capillary water, the leaves of the plant will show immediate symptoms of drought as they wilt and desiccate. If a plant is placed too deep in the soil and the water table submerges the entire root ball, the leaves of the plant will display yellowing or chlorosis. If this soaking persists longer than 3 to 4 weeks, it may kill the plant.

Longstem transplants of common New Mexico bosque woody vegetation grown in one-gallon, 14-inch treepots generally takes two to three years to produce from liner stock or three to four years from seed (Figure 2). Plants are kept well fertilized and irrigated during the growing process to achieve a 6–to 9-foot height. Considering both labor and supplies, it costs the LL PMC about \$8.00 to produce a single plant.

Survival by plant species of four, different Longstem Deep Plantings are listed in Tables 1 and 2. Photographs of plantings in their fourth and fifth year have been included (Figures 3-6).

Other locations where Longstem Deep Plantings have been done in New Mexico include the bosques of the Rio Puerco, Rio Grande, Rio Sapello, and the Pecos River. In Colorado, they have been done in the city of Pueblo and in the bosques of the Arkansas River and Runion Lake. For more information about these plantings, contact the following cooperators: Tree New Mexico (Susanne Probart @ 505-265-4554), Bureau of Reclamation (Nancy Umbriet @ 505-462-3599), Carlsbad Soil and Water Conservation District (Aaron Curballo @ 575-887-3506), and Army Corps of Engineers (Champe Green @ 505-342-3357).

Figure 1

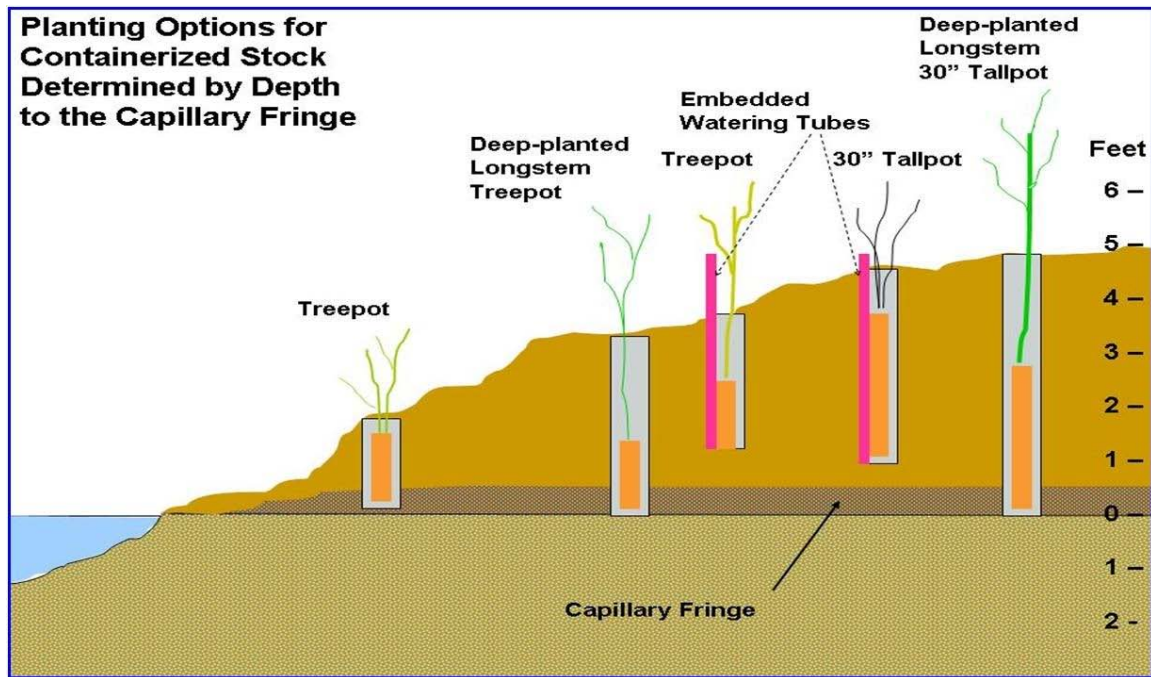


Table 1: Age of Planting and Total Irrigation Treatments Applied

Location	Bosque	Reinken	Rio Bravo	Veguita Bridge
Age of Planting (yrs)	4	2	5	1
Irrigation Treatments	0	1	2	1

Table 2: Percent Survival Rate of Longstem Transplants Planted at Capillary Fringe of Water Table at Five Locations

Location	<i>Amorpha fruticosa</i>	<i>Baccharis salicina</i>	<i>Forestiera pubescens</i>	<i>Lycium torreyii</i>	<i>Rhus trilobata</i>	<i>Ribes Aureum</i>	<i>Celtis reticulata</i>
Bosque	91 (n=350)	98 (n=379)	98 (n=708)	100 (n=18)		98 (n=48)	74 (n=152)
Reinken			97 (n=365)				
Rio Bravo			88 (n=1117)	83 (n=97)	93 (n=97)	91 (n=116)	
Veguita Bridge	88 (n= 52)	96 (n=49)	98 (n=351)	98 (n=62)			



Figure 2: Dormant *Forestiera pubescens* longstem transplants.



Figure 3: Overview of longstem transplant planting by the 4th year.



Figure 4: *Forestiera pubescens* longstem transplant by the 4th year.



Figure 5: *Baccharis salicina* transplants by the 4th year.



Figure 6: Adventitious root growth of an *Amorpha fruticosa* longstem transplant by the 5th year.